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ABSTRACT

This paper discusses the potential role of librarians in user education and training in the context of knowledge management (KM) initiatives. The paper first summarizes the results of a recent study of KM systems that found a high failure and disappointment rate, with more than half of the failures attributable to inadequate user training and education. The following two background issues are reviewed: the importance of rich communications, browsing, and serendipity; and the phenomenon that information workers, from researchers to managers, tend to consistently spend 20-25% of their work time in information seeking. User education and training are summarized for two KM domains, i.e., directed information/knowledge search and serendipity/browsing. Recommendations for the role of the librarian in user education and training are offered for three KM strategies (i.e., harvesting, hunting, and harnessing/hypothesizing): teaching database searching; teaching database mining; training users on the use of current awareness services; and teaching the use of groupware. The following key lessons for librarians are listed: (1) design the training and user education program first; (2) train users for directed information and knowledge search; (3) facilitate serendipity and browsing; (4) call it, and think of it, as "coaching," not user training or education; and (5) don't just show how--tell why. (Contains 14 references.) (MES)

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## Knowledge Management, User Education, and Librarianship

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***Abstract:***

*The role for librarians in Knowledge Management in terms of designing information systems, creating classification systems and taxonomies, and implementing and operating those systems is obvious. Not so obvious is a key role for librarians in user education and training. A recent study (KPMG Consulting, 2000) by KPMG of KM systems implementations reveals an alarmingly high failure and disappointment rate, with more than half of the failures attributable to inadequate user training and education (though remarkably this goes essentially unremarked upon). Librarians are skilled in user education and training- we have traditionally called it "bibliographic instruction". The need and the match is obvious.*

*This article develops that theme, and draws upon two other key information phenomenon:*

1. *the importance of rich communications, browsing, and serendipity and*
2. *the phenomenon that information workers, from researchers to managers, tend to spend a surprisingly consistent 20%-25% of their work time in information seeking*

*and draws conclusions from them about the potential role for librarians in user education and training in the context of KM initiatives.*

Knowledge Management, KM, is a topic that continues to burgeon in importance.* much of the overlap between KM and librarianship and the consequent opportunities for librarians are obvious-particularly the design of databases and systems, and the creation of classification schemes and taxonomies. There is a

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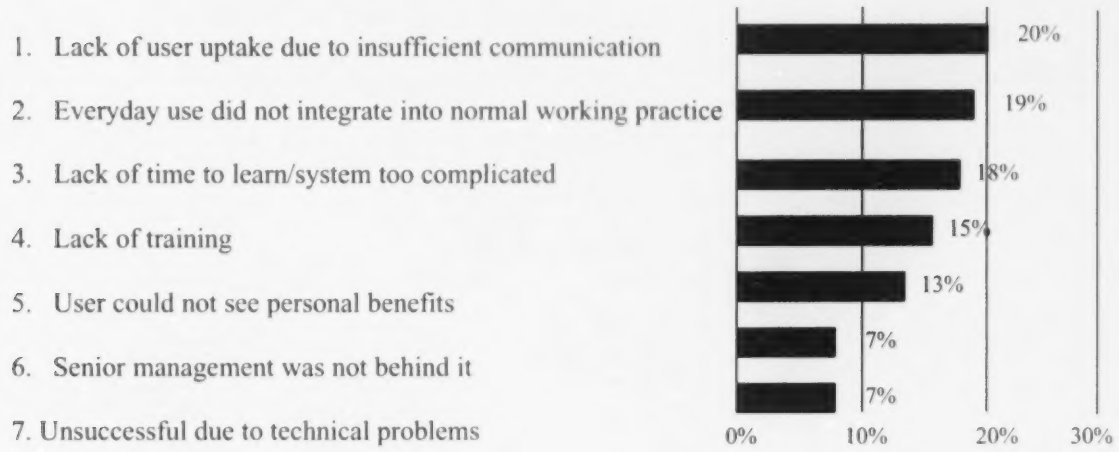
very important area of opportunity that is not so obvious however. That area is, if KM implementations are to be successful, the need for effective user support and user education and training. This lack of attention to user education and training is somewhat surprising. After all, it is now common to observe that although the phenomenon of management attention upon KM, Knowledge Management, was given birth to a large degree by the appearance of the internet and its brethren, intranets and extranets, fundamentally KM is more about people and corporate culture than it is about technology. And surely user education and training should be an important component of that emphasis upon people and corporate culture.

Both the importance of user education and training and the fact that that importance is not adequately realized is revealed in fascinating fashion by a recent study (KPMG Consulting, 2000) conducted by KPMG, a major international consulting firm. KPMG studied more than 400 firms as to their status in implementing KM systems. They reported that of the 288 firms that had KM in systems in place or were setting up such a system, there were 137 cases, where the benefits failed to meet expectations (and of that base of 288 firms, 127 were still only in the setting up phase). The breakdown of why benefits failed to meet expectations is as follows:

Why benefits failed to meet expectations
Why do you think the benefits failed to materialize?



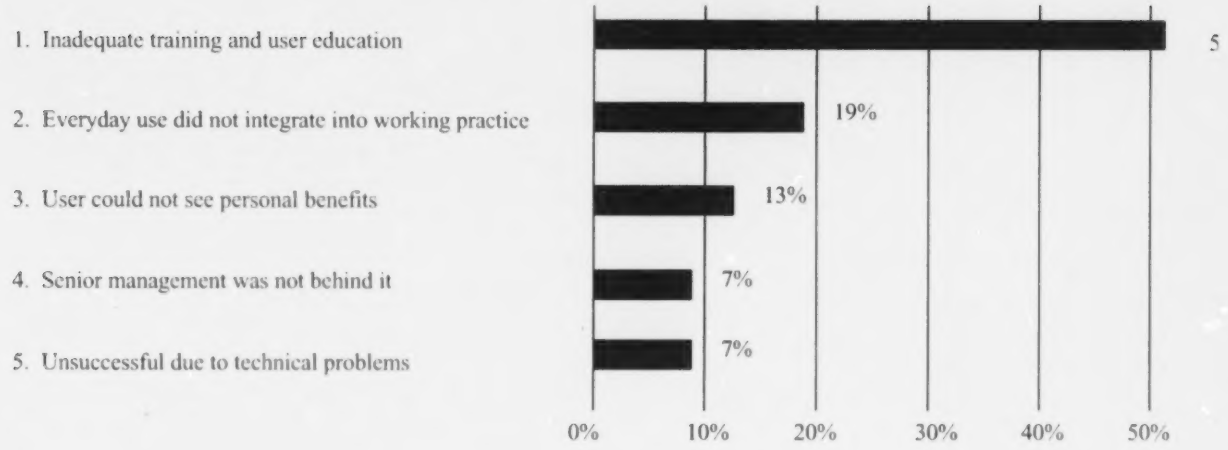

Base: all where benefits fail to meet expectations (137)

* Note these percentages add to 99% due to rounding error; there is no overlap.

*Indeed, the American Society for Information Science and Technology has earlier this year published in book form a bibliography of the Knowledge Management literature of almost 200 pages (Burden, 2000)

What is striking however, and striking on two levels, is that three reasons: #1) lack of user uptake due to insufficient communication, #3) lack of time to learn/ system too complicated, and #4) Jack of training, are all fundamentally the same reason -inadequate training and user education. With that recognized, the table can be recast in a much more informative fashion:

Why benefits failed to meet expectations
Why do you think the benefits failed to materialize?




Base: all where benefits fail to meet expectations (137)

Striking first, is that inadequate training and user education is by far the most prominent reason for why benefits failed to meet expectations, accounting for the majority of failures, exceeding all other reasons combined.

One small caveat is that as Davenport & Prusak (2000, p. 26) observe, sometimes lack of training may take the blame when the real culprit is a combination of naive expectation and a failure to adequately address the corporate cultural changes needed. Even with this factored in however, the predominance of the training and user education factor is striking. Offsetting, this caveat however is the observation that it is also quite likely that some component of reason 5, "Users could not see personal benefits", is also reflective of inadequate training and user education.

Striking second, is that the KPMG report fundamentally fails to pick up on this rather dramatic finding. To their credit, KPMG does observe that "These responses confirm the fundamental flaw in viewing KM as a technology issue: it is not the technology that is holding organizations back but a lack of strategy and a failure to build KM in the organization's day-to-day operations and its culture in order to encourage end-user buy-in.", but that is as far as they get toward a recognition of what their data really portrays.

An interesting comparison is that in KPMG's data, the percent that reports that inadequate training & user education was the principal problem for failure was 53% while the percent that reports that "senior management was not behind it" was the principal problem for failure was 7%.

It is of course not the case that senior management support is not important, but consider and contrast the proportion of the KM literature that emphasizes the key importance of getting senior management support with the proportion of the KM literature that emphasizes the key importance of setting up adequate and extensive support for user education and training, and one immediately gets a feel for the extent of the achilles heel problem. The culture of KM is clearly nowhere near adequately aware of the importance of training and user education, and the KPMG report illustrates and illuminates the problem in a wonderfully compelling fashion by ironically enough, only barely recognizing it.

**Librarians as the Trainers of the Users**

The immediate fit that should leap to our consciousness is that there is an obvious match here- there is a major problem with KM implementation, inadequate training and user education, and librarians have long been skilled in providing training and user education. We call that "bibliographic instruction". A major need for and a role for librarians in KM seems obvious.

So we can conclude that librarianship has a major contribution to make to Knowledge Management in the area of user education and training. Where do we go form there? What can we conclude more specifically?

Finally, remember and point out to others in your organization, that libraries have been concerned with and designing for the useablity of online information systems, OPAC's for example, longer than almost anyone else.

In addition to "design the training and education program first", what specific lessons are there?

**What can we conclude?**

There are a number if things that we can conclude, but before we get to that point, there are two important background issues that we need to review.

These two issues are:

1) The importance of rich communications, browsing, and serendipity.
2) The phenomenon that information workers, from researchers to managers tend to spend a surprisingly consistent 20% to 25% of their work time in information seeking.

**1) Rich Communications, Browsing, and Serendipity**

There is an extensive body of work documenting the relationships between knowledge worker productivity and organizational productivity, and rich communications, browsing, and serendipity.

The seminal work in this field is that by T.J. Allen (1977) who compared the winners with the losers in competing military research and development contracts, and examined their information environments. He found that the more productive teams were particularly characterized by having had more diverse information contacts outside the project team that did the less productive teams.

A particularly revealing work in that genre is a study conducted in the contest of the pharmaceutical industry, (Koenig, 1992) examining the information environment of the highly productive companies in contrast to the not so productive companies. The measure of productivity used was the number of approved new drugs per research dollar expended, refined further by weighting the measure in regard to: I) whether the FDA, the Food and Drug Administration, regarded the drug as an important therapeutic advance, or as simply a useful addition to the medical armamentarium, 2) the chemical novelty of the drug, and 3) the filing company's patent position with regard to the drug, an indication of where the bulk of the research was done. Research productivity, thus measured, differs among large pharmaceutical companies by more than an order of magnitude. The central finding of the study was that the more productive and more successful companies were characterized by a very much richer and more open information and communications environment.

What is perhaps the most striking result of the study however is that the single best predictor of research productivity and success was the extent to which employees disagreed with the statement that "my company puts more emphasis on the confidentiality of proprietary data than is typical for the industry". In other words, the greater the emphasis upon protecting the company's proprietary date, the less successful the company was in terms of creating new pharmaceutical products and getting new products into the pipeline.

In another rigorous study Orpen (1985) examined productivity in R&D intensive electronics/instrumentation organizations. He analyzed various aspects of the behavior of research managers as perceived by the research staff, and found that in the more productive organizations (as defined by rates of growth and return on assets) the managers were perceived to be significantly more characterized by three aspects of their behavior, all information related: I) they routed literature and references to scientific and technical staff; 2) they directed their staff to use scientific and technical information (STI) and to purchase STI services; and 3) they encouraged publication of results and supported professional meeting attendance and continuing education. Particularly striking was the finding that not only did information related management behavior tend strongly to discriminate between "high-performance" and "low-performance" companies, but that non information related management behavior did not have any apparent discriminatory value.

In reviewing the corpus of work on R&D innovation, Goldhar et al (1976) conclude that there are six characteristics of environments that are conducive to technological innovations. Again, the first three are all related to the information environment -specifically. 1) easy access to information by individuals; 2) free flow of information both into and out of the organization; 3) rewards for sharing, seeking and using "new" externally developed information sources. Characteristic number six is also information environment related, the encouragement of mobility and interpersonal contacts.

What is intriguing in these studies of the correlates of successful R&D is not only the consistency of the findings, but the phenomenon that when various factors are considered, the information related factors so consistently jump to the head of the list. Equally intriguing is the frequency with which the authors of the studies fail to remark on this phenomenon.

Also consistent within the studies is the importance of browsing and serendipity. In Koenig's study of the pharmaceutical industry for example, the researchers at the more productive pharmaceutical companies not only used their corporate library or information center more frequently, they used it proportionately much more for browsing and keeping abreast, as opposed to using it to address a specific information need. Indeed at the pharmaceutical company most highly rated for research success, Pfizer, the corporate message encouraging such browsing was abundantly clear. Immediately on entering the library at research headquarters one saw two long tables, one prominently labeled "Today's Journals" and the other prominently labeled "Yesterdays Journals". The researcher was obviously expected to be in the library, to be there frequently, and to be following the most current literature. By contrast, another large company, one very near the bottom of the list, Searle, made it very clear that the researchers should be at the laboratory bench doing their job, and when information was needed, they should ask for it to be delivered.

In a similar vein, Mondschein (1990) studied the productivity of researchers in major corporations in several industries, including pharmaceuticals and electronics. He found that scientists who used literature alerting services heavily were more productive (as measured by publication output, patents, and internal evaluations) than their colleagues who either did not use such services or used them only infrequently. Further, the productive researchers were characterized by their use of a wider variety of information sources, particularly by the extent of their efforts to stay current and by their use of patent information sources.
The literature received above is not exhaustive, but it is typical, and a thorough review of the literature (Koenig, 1990) reveals that it is remarkably uniform and consistent in its finding that there is a clear relationship between an organization's information environment and its productivity, and that richness, openness, and serendipity are the salient factors.

**2) The 20-25% Rule, "Satisficing"**

A very intriguing finding from studies of the work practices of white-collar professional employees is that they spent a rather consistent 20-25% of their time information seeking (Griffiths, 1982; King, McDonald, & Roderer, 1981 ; Nelke, 1999; Poppel, 1982; Roderer, King, & Brouard, 1983). This proportion is surprisingly independent of the apparent information intensity of the job domain. Line business managers and administrators spend as much of their time information seeking as do research

scientists. There seems to be a sort of homeostasis, or perhaps more accurately a satisficing mechanism at work. Knowledge workers whether managers or administrators or researchers need substantial information input to perform satisfactorily, but when the amount of time devoted to that function approaches roughly 20%, then knowledge workers appear to begin to satisfice, they begin to conclude that they have to get on with the rest of their job, and that if they have not already done so, they will soon run into diminishing returns in their information seeking, and that it is time to proceed based on what they have.

The obvious conclusion is that if knowledge workers are going to spend so much of their time information seeking, then they are likely to perform better if the systems and the environment is provided so that their time is spent efficiently. It is unlikely after all that that 20-25% figure arises because most knowledge workers coincidentally arrive at just the information they need at just that same point. It is rather more likely that they share an intuitive satisficing mechanism in common, and that they often proceed in their decision making with rather poorer information then they would have if a more supportive environment and more capable information and knowledge systems were in place.

**User Education and Training in the Different KM Domains**

The two points above immediately imply that here are at least two different domains for training and user education. The 20-25% satisficing point phenomenon implies the strategy of assisting information workers to apply that 20-25% of their time as efficiently as possible and creating an environment that makes it easy for them to do so, even impels them to do so. It thereby also implies a domain of directed searching. On the other hand, there is the undoubted utility of serendipity, and broad spectrum browsing, and serendipity is by contrast inherently somewhat messy and seemingly inefficient. This is clearly a second and different domain.

If this distinction is combined with the codification (creating structured information and knowledge sources) versus personalization (facilitating interpersonal contact and access to tacit knowledge) distinction popularized by Hansen, Nohria, and Tierney (1999), then we arrive at the tableau below:

| | /CODIFICATION | / PERSONALIZATION |
|---|---|---|
| **DIRECTED INFORMATION & KNOWLEDGE SEARCH** | Databases, external & internal<br><br>Content Architecture<br><br>Information Service Support (training required)<br><br>data mining<br>best practices / lessons learned | community & learning directories, findings & facilitating tools, groupware |
| **SERENDIPITY & BROWSING** | Cultural support (the Pfizer example)<br><br>current awareness profiles and databases<br><br>selection of items for alerting purposes / push<br><br>data mining<br>best practices | Cultural support<br><br>spaces - libraries & lounges (literal & virtual), cultural support, groupware<br><br>travel & meeting attendance |

(note the dashed lines are intended to indicate that the boundaries are porous and overlapping)

The utility of this tableau is that is serves as a chart for the different domains that need to be addressed for user education, and allows us to think more crisply about what is needed in training and user education.

Intriguingly, the tableau above turns out to be fundamentally identical to the tableau utilized for the last several years by IBM to explain and articulate KM, its functions and its components. The IBM Tableau is below:

**KNOWLEDGE MANAGEMENT STRATEGIES**

| | **COLLECT** / (Stuff) | **CONNECT** / (People) |
|---|---|---|
| EXPLOIT | HARVEST<br><br>example:<br>best practices | HARNESS<br><br>example:<br>response teams |
| EXPLORE | HUNTING<br><br>example:<br>data mining | HYPOTHESIZE<br><br>examples:<br>brainstorming<br>scenario analysis |

From: Tom Short
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The two tableaus are so consistent in fact that they can quite usefully be combined, superimposed, with no major distortions:

DOMAINS OF KNOWLEDGE MANAGEMENT STRATEGY, AND OF TRAINING & USER EDUCATION FOR KM

| | **COLLECTING (STUFF) & CODIFICATION** | **CONNECTING (PEOPLE) & PERSONALIZATION** |
|---|---|---|
| **DIRECTED INFORMATION & KNOWLEDGE SEARCH** | Databases, external & internal<br><br>Content Architecture<br><br>Information Service Support<br>(training required) | community & learning<br>directories, findings &<br>facilitating tools,<br>groupware |
| **EXPLOIT** | data mining<br>best practices / lessons learned<br><br>(HARVEST) | response teams<br><br>(HARNESS) |



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| | | |
|---|---|---|
| | Cultural support (the Pfizer example) | Cultural support |
| **SERENDIPITY & BROWSING** | current awareness profiles and databases | spaces - libraries & lounges (literal & virtual), cultural support, groupware |
| | selection of items for alerting purposes / push | |
| **EXPLORE** | data mining<br>best practices | travel & meeting attendance<br>brainstorming<br>scenario analysis |
| | (HUNTING) | (HYPOTHESIZE) |

(note the dashed lines are intended to indicate that the boundaries are porous and overlapping)

Scanning the tableau above reinforces the observation that KM is a multi-faceted undertaking and it also makes the point that user education and training is multi-faceted.

**Target the Domains**

Working from the tableau of domains, we can finally arrive at some at some conclusions and recommendations for the role of the librarian in user education and training in the context of KM.

***Harvesting:***

- Teach database searching

  Using and searching databases, external or internal, is not intuitively easy. There is an immense literature on database searching attesting to this inconvenient fact. In the welter of publicity in the last several years about the Internet, it is easy to overlook the fact that online database searching goes back three decades, and that while the quantity of material online has mushroomed, the quality of the tools and techniques has changed very little in more than a quarter century. Teaching users how to use database systems effectively is just as mandatory now as it was in 1971 when the world of online databases blossomed (Koenig, 1992 B).

- Teach database mining

  The use of tools for database mining and manipulation is an area that is particularly non-intuitive. The average user does not intuitively think in terms of relational databases. Effective data base mining simply won't happen without training.

***Hunting:***

- Train users on the use of current awareness services.

  Just like doing an online search, setting up a good profile for a current awareness service, despite what vendors will say, is not easy or intuitive. It requires skill and experience to design a good profile.

Secondly, over time, people's interests and responsibilities tend to diverge from their profile. Profiles need to be updated and maintained, and the best way to accomplish this is to set up a procedure whereby an information professional (as distinct from an IT professional) periodically makes an appointment with key employees to lead them through an information requirement determinations interview and update their profile. Otherwise, if users are left to their own devices, profiles seldom are updated since there is no triggering event as the profiles gradually become less relevant. In addition, the revisions will be more effective if an experienced database searcher takes part.

***Harness & Hypothesize***

- **Teach the use of groupware**

Even systems that are designed to be easy to use aren't as easy as they are made out to be, and people are very reluctant to admit their lack of knowledge. Whether the software in question consists of search engines, or word processing, or statistical packages, or groupware, there is a consistent set of findings that most users learn only the very basic functionalities and their skills plateau there. With a bit of education, including refresher training, users can make much more effective use of their tools.

**What other Lessons are there?**

- **Think in Terms of Coaching**

In so far as practicable, user education and training for busy professional should be personnel and one-on-one. That is, one should think of and design user education and training as coaching. The most successful KM implementations, a classic example being BP's virtual teamwork program (Davenport & Prusak, 2000, p.20 & 21) have been successful precisely because they designed and thought of their user education and training program as coaching.

- **Design the Training and Education Program First**

Another conclusion comes straight out of classic systems design and implementation lore.
A well worn but very valuable precept in systems analysis is "Write the User Manual First". The point is that taking the time to write the user manual first, or at least very early on in systems development, forces the design team to put themselves in the user's shoes and to think very clearly about what the system will and will not do. It helps avoid the common problem of the systems development drifting off in the direction of the easily doable, or what the programmer thinks is clever or neat, rather than the often more prosaic direction of what the user really needs. And, of course, it helps ensure that the system does what is needed in a fashion that is effective, easy to use, and relatively easy to train users to use.

The KM analog of this is "design the training and education program first" or at least as early on as is practicable. There are two sets of reasons why. The first set is precisely those given above, after all, implementing KM is a systems development project. It is however a systems development project in which the cultural aspects are of even more critical importance than in most projects. The second set of reasons derives from the importance of those cultural aspects.

If one thinks about a program for user education and training, one has not only to think about

how one uses the system, one has to be prepared to answer the questions, why? In asking, and answering, the question -why? The team is forced to address what the system is trying to accomplish, whether it is likely to be accomplished, and what stands in the way, typically cultural issues, and then the question arises, what is being done and what can be done to address those issues?

- Sea Stories and Change Agentry - the Why.

An extremely important point, one that deserves a major article in its own right is that user education is not just about the how to; it is also about the why. User education must also impart the why, why are KM systems being put in place and how will both the user and the organization benefit. The educator/trainer is therefore also a change agent. The most effective tool of the change agent/trainer is the "sea story", the story of the positive experience of others in using the systems. Don't just talk about the hypothetical advantages, give concrete examples; tell sea stories.

**In summary:**

Inadequate user training and education is by far the most prevalent reason for failure in KM, and it is an easily preventable reason.

The key lessons are:

- Design the training and user education program first. The first order effect of this strategy is that it directly addresses the principal reason for KM implementation failure, and the second order effect is that it focuses attention on the "why" of KM and upon the cultural changes that need to be accomplished.

- Train users for directed information & knowledge search (and give them good support). If users don't do this efficiently, they can squander their information search time up to the 20-25% satisficing point, and have inadequate time left for:

- Facilitate Serendipity and Browsing, for which the users need a supportive corporate culture, and more training and user education.

- Design the training and user education program first. The first order effect of this strategy is that it directly addresses the principal reason for KM implementation failure, and the second order effect is that it focuses attention on the "why" of KM and upon the cultural changes that need to be accomplished.

- Call it, and think of it, as "Coaching", not user training or education.
  Not only do users respond better, but it puts the "coaches" in the right frame of mind, emphasizing that the interaction is, or should be, more apt to be personal and one-on-one, rather than classroom training and education, interactive not passive.

- Don't just show how; tell why, tell sea stories.

With these guidelines in mind, librarians can not only make the point about the need for user education and training and their ability to make a contribution, they can begin to describe specifically what needs to be done and how they can help accomplish it.

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